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CASE REPORT

Bilateral renal cortical necrosis following abdominal surgery

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Abstract

A 58-year-old patient developed complete anuria following elective abdominal surgery for an ileocaecal mass. Contrast-enhanced computed tomography demonstrated absent intra-renal blood flow and a kidney biopsy confirmed diffuse cortical necrosis. Histology of the ileocaecal mass displayed deep fissuring which was diagnostic of Crohn's disease. Bilateral renal cortical necrosis (BRCN) is a rare complication of surgery but should be considered in any patient developing complete anuria. Since the disease is often associated with a coagulopathy, conditions predisposing to thrombosis should be sought. Inflammatory bowel disease (IBD) with surgical complications, as in this case, should be considered among the conditions which may predispose to BRCN.

Key words: Abdominal surgery, anuria, biopsy, bilateral renal cortical necrosis, inflammatory bowel disease.

Background

Bilateral renal cortical necrosis (BRCN) is a rare cause of acute kidney injury. Obstetric complications accounts for most of the cases.[1] BRCN following complicated surgery is very rare with a single report of BRCN following liver transplantation.[2] Renal involvement in inflammatory bowel disease is not uncommon and may represent complications directly related to the IBD or complications related to treatment. In this case report we describe a case of BRCN following complicated abdominal surgery.

Case report

A 58-year-old black man, known with hypertension, was admitted to a peripheral hospital to have a colectomy for an ileocaecal mass causing intermittent bowel obstruction. On admission his serum creatinine was 71µmol/l. The surgery done at the peripheral hospital was reported as uncomplicated, although a subsequent chart review revealed intra-operative hypotension. The pre-operative blood pressure had been 180/100mmHg and had fallen to a mean of 100/70mmHg for two hours intra-operatively. The day after surgery he reported that he had not yet passed any urine. Serum creatinine was found to be 279µmol/l. A physical examination did not suggest a full bladder and an ultrasound excluded hydronephrosis. He was then referred to our hospital.

On arrival, two days after surgery, he was still anuric. Examination was unremarkable. A repeat ultrasound did not reveal hydronephrosis; renal sizes were 10.8cm and 11cm. The serum creatinine was 657µmol/l. A Tc99m-MAG3 radioisotope scan revealed the complete absence of blood flow to the kidneys. We considered renal arterial or venous

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occlusion and requested a contrast-enhanced CT scan. This showed good flow through the main renal arteries, but non-enhancement of the cortices, indicating absent intra-renal blood flow (Figure 1).

Figure 1: Computed tomography of the kidneys, with contrast, revealed no enhancement of the renal cortices, indicating absent intra-renal blood flow.

One week after the colectomy, a kidney biopsy was performed, confirming diffuse cortical necrosis (Figure 2A). The ileocaecal mass was reported as consistent with inflammatory bowel disease (IBD, Figure 2B). The patient was managed conservatively due to resource limitations which restricted the availability of renal replacement therapy. He was discharged a few days later.

Figure 2A: Kidney biopsy with cortical necrosis. There is almost complete loss of nuclear staining. The outlines of three glomeruli are visible in the centre of the image.

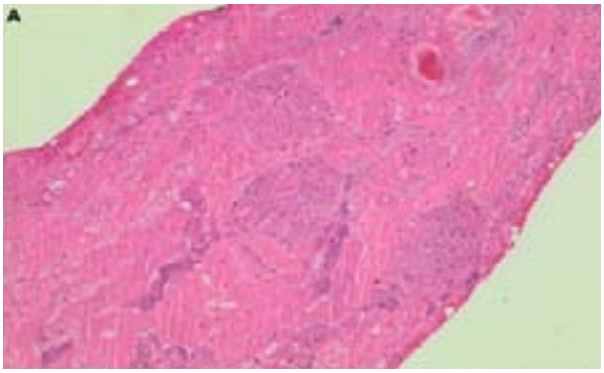
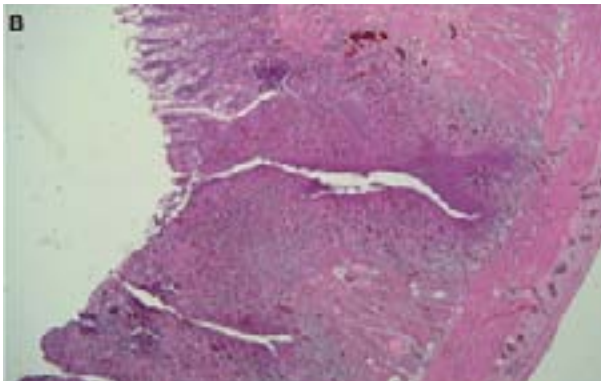


Figure 2B: Deep fissures in the terminal ileum in keeping with Crohn's disease.



Discussion

Bilateral renal cortical necrosis (BRCN) is a rare but devastating condition accounting for 2-6% of cases of acute kidney injury.[3,4] Obstetric complications account for approximately a third of all cases.[1] These complications include postpartum haemorrhaging due to placental abruption, septic abortion, and pre-eclampsia with HELLP syndrome.[3] Other precipitating events include shock, severe burns, pancreatitis, diabetic ketoacidosis, haemolytic uremic syndrome and medication such as non-steroidal anti-inflammatory drugs.[3,4] This, to the best of our knowledge, is the first report of BRCN following abdominal surgery.

The pathogenesis of BRCN is poorly understood but involves intense and sustained renal arterial vasospasm and is often associated with a coagulopathy. It is well known that inflammatory bowel disease (IBD) is associated with an increased risk of thromboembolism.[5-7] A recent study found an increased risk of venous thromboembolism in patients with IBD following a colectomy.[8] IBD may therefore be an additional risk factor in our patient. Renal disease in individuals with IBD is not uncommon, and includes nephrolithiasis, tubulointerstitial nephritis, amyloidosis and glomerulonephritis.[9] However, BRCN in association with IBD has not been described to date.

The most striking presenting feature of BRCN is complete anuria. Other causes of anuria should be excluded, particularly obstructive uropathy. The differential diagnosis includes bilateral renal artery or vein thrombosis.

Diagnostic tests include abdominal radiography

to look for the classic "eggshell" cortical calcifications although this has low sensitivity.[4] A Doppler ultrasound to assess cortical perfusion also lacks sensitivity.[4] A contrast-enhanced CT scan correlates well with histology and may be the imaging modality of choice. Typical CT features include failure of cortical enhancement, presence of medullary enhancement and reduced excretion of contrast into the collecting system.[10]

The gold standard for diagnosis remains a kidney biopsy, which may also assist in prognosis. There may be irreversible loss of kidney function depending on the extent of involvement. Patients with patchy involvement (30-50% necrotic glomeruli) may regain kidney function[3] while those with diffuse involvement (greater than 50% necrotic glomeruli) are likely to remain dialysis dependent.[3]

Conclusion

BRCN is a rare complication of surgery but should be considered in any patient developing complete anuria. Since the disease is often associated with a coagulopathy, conditions predisposing to thrombosis should be sought. IBD with complicated surgical interventions, as in this case, should be considered among the conditions which may predispose to BRCN.

Supplementary files

High resolution versions of the images are available as supplementary files.

Conflict of interest

None to declare.

References

1. Prakash J, Vohra R, Wani IA, et al, Decreasing incidence of renal cortical necrosis in patients with acute renal failure in developing countries: A single-centre experience of 22 years from eastern India, Nephrol Dial Transplant, 2007, 22(4):1213-1217.
2. Palapattu GS, Barbaric Z, Rajfer J, Acute bilateral renal cortical necrosis as a cause of postoperative renal failure, Urology, 2001, 58(2):281.
3. Prakash J, Tripathi K, Pandey LK, Sahai S, Usha, Srivastava PK, Spectrum of renal cortical necrosis in acute renal failure in eastern India, Postgrad Med J, 1995, 71(834):208-210.
4. Kim HJ, Bilateral renal cortical necrosis with the changes in clinical features over the past 15 years (1980-1995), J Korean Med Sci, 1995, 10(2):132-141.
5. Kamdar A, Alsafi A, Halse O, Cerebral sinus thrombosis occurring in a patient with ulcerative colitis treated with the Chinese herbal medicine YanNan BaiYao, QJM, 2015, 108(3):239-240.
6. Pariente A, Thromboembolic risk in inflammatory bowel disease, Rev Prat, 2014, 64(6):759-760.
7. Koutroubakis IE, The relationship between coagulation state and inflammatory bowel disease: Current understanding and clinical implications, Expert Rev Clin Immunol, 2015, 11(4):479-488.
8. Wilson MZ, Connelly TM, Tinsley A, Hollenbeak CS, Koltun WA, Messaris E, Ulcerative colitis is associated with an increased risk of venous thromboembolism in the postoperative period: The results of a matched cohort analysis, Ann Surg, 2014.
9. Katsanos KH TE, The kidneys in inflammatory bowel disease, 2002,15(1):41-52.
10. Jordan J, Low R, Jeffrey RB Jr, CT findings in acute renal cortical necrosis, J Comput Assist Tomogr, 1990, 14(1):155-156.